Accession No. 408938-06

DATA EVALUATION RECORD

1. **CHEMICAL:** Sulfosate

2. **TEST MATERIAL:** SC-0224 4LC-E; 39.9% a.i.
Lot No. WFK-0501; ~~Sample purity not specified~~

3. **STUDY TYPE:** Static Acute Toxicity Test. Species Tested: bluegill sunfish, (Lepomis macrochirus)

4. **CITATION:** Bowman, J.H. (1987) Acute Toxicity of SC-0224 4LC-E to Bluegill Sunfish (Lepomis macrochirus), ABC Study No. 35637. Prepared by Analytical Bio-Chemistry Laboratories, Inc., Columbia, Missouri; submitted by Stauffer Chemical Co., Richmond, Calif.; Accession No. 408938-06.

5. **REVIEWED BY:**

Kimberly D. Rhodes
Aquatic Toxicologist
Hunter/ESE

Signature: Kimberly D. Rhodes
Date: 01/09/89

6. **APPROVED BY:**

Prapimpan Kosalwat, Ph.D.
Staff Toxicologist
KBN Engineering and
Applied Sciences, Inc.

Signature: P. Kosalwat
Date: January 11, 1989

Henry T. Craven
Supervisor, EEB/HED
USEPA

Signature: Henry T. Craven
Date: 1/30/89

7. **CONCLUSIONS:** This study appears scientifically sound, ~~but~~ and would ~~does not~~ fulfill the Guideline requirements for a 96-hour with this formulation. static acute study for a warmwater fish species. The 96-hour LC50 based upon nominal concentrations of SC-0224 4LC-E to bluegill sunfish (Lepomis macrochirus) was 297 mg/L, which classifies it as practically non-toxic to ~~rainbow trout~~. The NOEC was determined to be 100 mg/L after 96 hours. bluegill sunfish.

8. **RECOMMENDATIONS:** N/A

9. **BACKGROUND:**

10. **DISCUSSION OF INDIVIDUAL TESTS:** N/A

11. **MATERIALS AND METHODS:**

A. **Test Animals:** Bluegill sunfish (Lepomis macrochirus) were obtained from a commercial supplier in Missouri and were held for a minimum of 14 days in culture tanks on a 16-hour daylight photoperiod prior to testing. The bluegill sunfish used for this experiment had a mean weight of 0.36 (±0.064) grams and a mean standard length of 26 (±1.3) millimeters. The chamber loading biomass was 0.24 grams/liter for the definitive study. Fish received a standard commercial fish food occasionally supplemented with brine shrimp nauplii (Artemia sp.) daily until 48-96 hours prior to testing.

B. **Test System:** The test was conducted in five-gallon glass vessels containing 15 L of soft reconstituted water. The reconstituted water was composed of 48 mg $NaHCO_3$, 30 mg $CaSO_4 \cdot 2H_2O$, 30 mg $MgSO_4$, and 2 mg KCL per liter of deionized water. The temperature was maintained by a water bath at 22 ± 1°C. Five concentrations and a control were used to determine the toxicity of SC-0224 4LC-E to bluegill sunfish.

The water parameters of the dilution water were a total hardness of 42 mg/L as $CaCO_3$, a total alkalinity of 30 mg/L as $CaCO_3$ and a pH of 7.6. The 0-hour measured control water parameters of this dilution water were dissolved oxygen 9.4 mg/L and pH 7.8.

C. **Dosage:** 96-hour static acute test.

D. **Design:** A 96-hour range-finding and definitive test were conducted. The range-finding test concentrations were set at 1.0, 10, and 100 mg/L. Based on the results of preliminary testing, five concentrations of the test compound, ranging in a logarithmic series from 100 to 1000 were tested. Ten fish were added per chamber within 30 minutes following preparation of nominal concentrations. Treatments were not duplicated. A control and nominal SC-0224 4LC-E concentrations of 100, 180, 320, 560 and 1000 mg/L were maintained. All concentrations were observed once every 24 hours for mortality and abnormal effects.

E. **Statistics:** The computer program developed by Stephan et al. was used to calculate the LC50 values.

12. **REPORTED RESULTS:** "Nominal test concentrations, mortality rates, and water quality data are presented in Table 3 (attached)." The 24-, 48- and 96-hour LC50 values for nominal concentrations of SC-0224 4LC-E were 360, 360 and 300 mg/L, respectively. The no-effect concentration based on mortality and abnormal effects was 100 mg/L after 96 hours. The abnormal effects of mortality, surfacing, loss of equilibrium, fish on the bottom of test chamber and quiescence were observed in the 180, 360, 560, and 1000 mg/L test concentrations during the 96-hour exposure period. The dissolved oxygen concentrations ranged from 2.3 to 9.5 mg/L (26 to 106% saturation at 22 and 21°C, respectively) during the test. The oxygen depletion was likely due to the test compound, as the control solution remained within an acceptable range for testing.

13. **STUDY AUTHOR'S CONCLUSIONS/QUALITY ASSURANCE MEASURES:** The 96-hour LC50 value for SC-0224 4LC-E based upon nominal concentrations was estimated to be 300 mg/L with a 95 percent confidence interval of 180 to 560. The NOEC (No- Observed-Effect Concentration) was 100 mg/L after 96-hours.

    The study was conducted following the intent of the Good Laboratory Practice Regulations and the final report was reviewed by Analytical Bio-Chemistry Laboratories' Quality Assurance Unit. A Quality Assurance Statement was included and signed by the Quality Assurance Officer.

14. **REVIEWER'S DISCUSSION AND INTERPRETATION OF STUDY RESULTS:**

    A. **Test Procedure:** The test procedures were generally in accordance with protocols recommended by the Guidelines, but deviated from the SEP as follows:

    - The test material was not clearly identified as to exact purity.
    - Six hour temperature measurements were not recorded as required by the SEP for tests conducted in a water bath.
    - Individual fish (0.36 $\pm$ 0.064 gram) used for the test were smaller than the recommended 0.5 - 5 gram range.
    - The SEP states that each designated treatment group should be exposed to a concentration of toxicant that is at least 60% of the next highest concentration. Each designated treatment group for the test was only 56% of the next highest concentration.

- o The SEP states that the dissolved oxygen level during the first 48 hours should be between 60% and 100% of saturation and between 40% and 100% saturation after 48 hours. The dissolved oxygen concentration was as low as 2.3 mg/L or 26% saturation in test concentration 320 mg/L at 96-hours.

B. **Statistical Analysis:** The reviewer used the Toxanal computer program to calculate the LC50 values. These calculations are attached. The binomial test provides a 96-hour LC50 value of 297 mg/L with a 95 percent confidence interval of 180 to 560 mg/L, which is similar to that reported by the author.

C. **Discussion/Results:** The study results appear to be scientifically valid, however, the lack of test substance purity does not permit final evaluation of the substance's toxicity to bluegill. The 96-hour LC50 value based upon nominal concentrations was estimated to be 300 mg/L. Therefore, SC-0224 4LC-E is classified as practically non-toxic to bluegill sunfish (Lepomis macrochirus).

D. **Adequacy of the Study:**

(1) **Classification:** SUPPLEMENTAL Core, for this formulation

(2) **Rationale:** Purity of the test substance not provided.

(3) **Repairability:** Yes, submit purity of the test substance.

15. **COMPLETION OF ONE-LINER FOR STUDY:** Yes, 01-09-89.

- 39.9% a.i., according to proposed label
- Confidential Statement of Formula also on file with Agency

No. _____ Chemical Name sulfosate Chemical Class practically non-toxic Page ___ of ___

SC-0224 4LC-E

Study/Species/Lab/ Succession	Chemical % a.i.	Results	Reviewer/ Date	Validation Status
14-Day Single Dose Oral LD_{50}		LD50 = mg/kg (95% C.L.) Contr. Mort.(%)=		
Species	_____	Slope= # Animals/Level= Age(Days)= Sex =	_____	_____
Lab		14-Day Dose Level mg/kg/(% Mortality) ( ), ( ), ( ), ( ), ( )		
Acc.		Comments:		
14-Day Single Dose Oral LD_{50}		LD50 = mg/kg (95% C.L.) Contr. Mort.(%)=		
Species	_____	Slope= # Animals/Level= Age(Days)= Sex =	_____	_____
Lab		14-Day Dose Level mg/kg/(% Mortality) ( ), ( ), ( ), ( ), ( )		
Acc.		Comments:		
8-Day Dietary LC_{50}		LC50 = ppm (95% C.L.) Contr. Mort.(%)=		
Species		Slope= # Animals/Level= Age(Days)= Sex =		
Lab	_____	8-Day Dose Level ppm/(%Mortality) ( ), ( ), ( ), ( ), ( )	_____	_____
Acc.		Comments:		
8-Day Dietary LC_{50}		LC50 = ppm (95% C.L.) Contr. Mort.(%)=		
Species		Slope= # Animals/Level= Age(Days)= Sex =		
Lab	_____	8-Day Dose Level ppm/(%Mortality) ( ), ( ), ( ), ( ), ( )	_____	_____
Acc.		Comments:		
8-Day Dietary LC_{50}		LC50 = pp__ (95% C.L.) Contr. Mort.(%)= Sol. Contr. Mort.(%)=		
Species		Slope= # Animals/Level= Temperature =		
Lab	_____	96-Hour Dose Level ppm /(%Mortality) ( ), ( ), ( ), ( ), ( )	_____	_____
Acc		Comments:		
96-Hour LC_{50}		LC50 = 297 ppm (95% C.L. 180-560) Con. Mor(%)= 0 Sol. Con. Mor.(%)= N/A	K.R. 1/9/88	Suppl Core, for 4LC-E formulation
Species Lepomis macrochirus		Slope= not given # Animals/Level= 10 Temp.=22±1°C		
Lab Analytical Bio-Chemistry Laboratories not specified		96-Hour Dose Level ppm /(%Mortality) 100 (0), 180 (0), 320 (60), 560 (100), 1000 (100)		
Acc. 408938-06		Comments: Based on nominal concentrations		
96-Hour LC_{50}		LC50 = pp__ (95% C.L.) Con. Mort.(%)= Sol. Con. Mort.(%)=		
Species		Slope= # Animals/Level= Temp.=		
Lab	_____	96-Hour Dose Level pp /(%Mortality) ( ), ( ), ( ), ( ), ( )	_____	_____
Acc.		Comments:		

TABLE 3

Mortality Rates and Water Quality Measurements During the Acute Toxicity Test of SC-0224 4LC-E to Bluegill Sunfish (Lepomis macrochirus)

Nominal Concentration (mg/l)	Percent Mortality Hours			Water Quality								
				0-hours			48-hours			96-hours		
	24	48	96	Temp. °C	D.O.[a] mg/l	pH[b]	Temp. °C	D.O. mg/l	pH	Temp. °C	D.O. mg/l	pH
Control	0	0	0	21	9.4	7.8	21	6.7	7.4	22	5.9	7.0
100	0	0	0	21	9.4	6.9	21	6.4	7.0	22	3.0	6.6
180	0	0	0			6.5				22	3.2	6.5
320	30	30	60	21	9.4	6.2	21	6.6	6.5	22	2.3	6.3
560	100	100	100			5.9						
1000	100	100	100	21	9.5	5.6						

[a]Dissolved oxygen concentrations - Dissolved Oxygen Probe (YSI Model 54).

[b]pH - pH Probe (Corning Model 476182) used with a Corning Model 125 pH and mV meter.

NOTE: Dissolved oxygen saturations at the test temperatures of 21 and 22°C are 9.0 and 8.8 mg/l, respectively.